ECONOMIC RESEARCH
FEDERAL RESERVE BANK OF ST. LOUIS

WORKING PAPER SERIES

Cracks in the Facade: American Economic and Financial Structures After the Boom

Authors	William R. Emmons, and Frank A. Schmid
Working Paper Number	2002-026A
Creation Date	November 2002
Citable Link	https://doi.org/10.20955/wp.2002.026
Suggested Citation	Emmons, W.R., Schmid, F.A., 2002; Cracks in the Facade: American Economic and Financial Structures After the Boom, Federal Reserve Bank of St. Louis Working Paper 2002-026. URL https://doi.org/10.20955/wp.2002.026

Federal Reserve Bank of St. Louis, Research Division, P.O. Box 442, St. Louis, MO 63166

The views expressed in this paper are those of the author(s) and do not necessarily reflect the views of the Federal Reserve System, the Board of Governors, or the regional Federal Reserve Banks. Federal Reserve Bank of St. Louis Working Papers are preliminary materials circulated to stimulate discussion and critical comment.

CRACKS IN THE FAÇADE: AMERICAN ECONOMIC AND FINANCIAL STRUCTURES AFTER THE BOOM

William R. Emmons *

Bank Supervision and Regulation Division
Federal Reserve Bank of St. Louis
411 Locust Street
St. Louis, MO 63102, U.S.A.
Tel.: 314-444-8844
Fax: 314-444-8740
E-mail: emmons@stls.frb.org

Frank A. Schmid *

Research Division
Federal Reserve Bank of St. Louis
411 Locust Street
St. Louis, MO 63102, U.S.A.
Tel.: 314-444-8804
Fax: 314-444-8731
E-mail: frank.a.schmid@stls.frb.org

August 20, 2002

---

* The views expressed in this chapter are those of the authors and not necessarily those of the Federal Reserve Bank of St. Louis or the Federal Reserve System.

CRACKS IN THE FAÇADE: AMERICAN ECONOMIC AND FINANCIAL STRUCTURES AFTER THE BOOM

Abstract

The United States experienced a historic boom during the late 1990s and briefly into the new millenium, highlighted by rapid economic and productivity growth, surging corporate profitability, sustained business investment in many areas, including high technology and telecommunications, and a soaring stock market. Many observers concluded that a "new era" had arrived. Meanwhile, the prestige of the Federal Reserve rose along with faith in the U.S. economy and its stock market. Deflation of the great boom brings with it many unanswered questions. Was there ever really a "new era" in the U.S. economy and stock market? Will the future be more like the boom years or the lackluster decades that preceded it? How important were the uniquely American economic and financial structures so admired around the world while the boom lasted? Can the Federal Reserve's prestige survive the collapse? This chapter explores cracks in the façade of the great American boom of the late 1990s.

CRACKS IN THE FAÇADE: AMERICAN ECONOMIC AND FINANCIAL STRUCTURES AFTER THE BOOM

Many observers of the boom in the United States during the late 1990s concluded that a "new era" had arrived. Real economic growth averaged almost four percent annually during the five years ending March 2000, compared to about three percent per year during the preceding 20 years. Inflation-adjusted increases in stock prices (measured by the Wilshire 5000) averaged nearly 19 percent annually during the five years ending March 2000, compared to about 3 percent annual increases during the preceding 20 years. The prestige of the Federal Reserve and its chairman, Alan Greenspan, rose along with faith in the U.S. economy, the dollar, and its stock market.

During the nine quarters following March 2000, however, the U.S. economy fell into its first recession in 10 years; the annualized rate of real economic growth during those nine quarters was only 1.4 percent. Real stock prices fell at a 21 percent compounded annual rate, wiping away about $4.9 trillion of paper wealth ($5.2 trillion after inflation adjustment). Corporate profitability and business investment—especially in high technology and telecommunications—collapsed. Bankruptcy and bond default rates increased as the huge debt loads taken on by optimistic entrepreneurs and established firms alike became crushing burdens unsupportable by dwindling revenues. Corporate-governance scandals threatened to undermine the prestige of the American financial system.

Meanwhile, federal-government budget deficits re-emerged as tax revenues plunged and spending commitments—especially relating to the aftermath of the September 11 terrorist attacks—soared. The Federal Reserve slashed short-term interest rates by almost five full percentage points during 2001. Despite the abrupt shift toward stimulative fiscal and monetary policies, the economic and financial vital signs of the U.S. economy remained unusually fragile during mid-2002.

Was there ever really a "new era" in the U.S., as suggested by its outstanding economic and financial performance during the late 1990s? Will the boom quickly resume after the current

interruption? More specifically, will corporate profitability, business investment, productivity growth, and the stock market pick up where they left off before the recession? Can the Federal Reserve's prestige survive the collapse of the 1990s boom?

This chapter describes several key aspects of the U.S. economy and its financial system both before and after the great boom of the 1990s. In the first section of the chapter we briefly sketch some of the international background against which U.S. economic and financial structures should be assessed. This is followed by an assessment of the efficacy of financial markets in allocating scarce resources to their best use. The next section discusses risk sharing and financial systems. We then discuss the role of monetary policy in financial markets and its implications for business investment decisions. Before concluding, we discuss ongoing imbalances in the U.S. economy and their implications for financial markets.

I. International Comparison of Financial Systems

Compared to other countries, one of the more striking characteristics of the U.S. economy is its highly sophisticated set of financial markets. As reported in Dimson, Marsh, and Staunton (2002, p. 12), the ratio of stock market capitalization to GDP at the beginning of the year 2000 amounted to 182 percent in the United States. This was lower than in Switzerland (267 percent of GDP) and the United Kingdom (203 percent), but was higher than the 105 percent of Japan or the 68 percent of Germany. Market capitalization of the U.S. bond market amounted to 159 percent of GDP at the beginning of 2000, highest among all countries (Dimson, Marsh, and Staunton, 2000, p. 15). In fact, most industrialized countries rely more heavily on the banking system than either the stock or bond markets for allocating savings into investment capital.

There are two possible (not necessarily mutually exclusive) explanations for why the United States has a comparatively greater financial-markets orientation than other countries. First, similar to the United Kingdom, the United States is a common-law country and organized as an individualistic society,

compared to the more communitarian and somewhat paternalistic civil-law countries typified by Germany and France. Second, the United States, like the United Kingdom, became a democracy early on. Democracy and a market economy with private ownership are isomorphic because both are manifestations of self-determination. The ideal of the self-determined individual, which was born during the period of the Enlightenment, manifested itself most significantly in the Declaration of Independence in 1776, Adam's Smith *Wealth of Nations* of the same year, and the French Revolution commencing in 1789.

Unlike France, however, the United States did not slip back into an authoritarian regime as the 19th century began. And unlike England, the United States was able to expand economically on its own territory and hence did not suffer from loss of territory and resources during the period of de-colonization. Finally, unlike Germany and Japan—neither of which embraced democracy until the 20th century—the United States was able to struggle with and develop its own form of democratic rule over many generations. It bears emphasizing that American democracy is an unusually long-lived "survivor" in global historical terms, a fortunate experience that allowed its economic and financial structures to mature at their own pace. By way of contrast, in one of the greatest political, humanitarian, and not least, economic disasters of modern times, Germany voluntarily relinquished its fledgling democracy originating in 1918 after only 25 years—receiving, in return, a catastrophic 13-year dictatorship. Japan, of course, lacked even this fleeting early taste of democracy. It was not before the end of WW II that democracy became widely accepted in Germany and Japan, and modern economic and financial institutions finally could establish themselves. A "head start" of a century and a half certainly provided American institutions some advantages.

Success tends to feed on itself—at least for some time. In order to understand the economic and financial structures of the United States, it is essential to realize that the U.S. stock market is an extraordinary survivor. Arnott and Bernstein (2002) report on four stock markets that realized catastrophic losses of minus 100 percent in the 20th century: China, Russia, Argentina and Egypt. It

should be noted that Russia was a significant economic and military power at the beginning of the 20th century and, therefore, would have been a significant component of any globally well-diversifed stock-market portfolio at the time. Furthermore, the stock markets of two other countries, Germany and Japan, came close to extinction after WW II. As reported by Dimson, Marsh and Staunton (2002), the German stock market suffered an inflation-adjusted loss of 91 percent during the period 1945-48, while the Japanese market plummeted by 97 percent during the 1944-47 period. In comparison, between September 1929 and June 1932, the inflation-adjusted value of the U.S. S&P Composite Index fell by 80.6 percent, as reported by Shiller (2000). Other countries' stock markets have "melted down" at various times for a wide variety of reasons, and many others—including perhaps even the U.S. market—will do so in the future. As Bennett (1998) and Taleb (2000), among others, point out, a rare but plausible event is virtually certain to occur if we extend the time horizon long enough into the future.

II. Legal Institutions and Asymmetric Information in Financial Systems

In a seminal paper, La Porta et al. (1998) suggest that cross-country differences in financial systems are related to legal differences across countries. Different legal systems offer different degrees of investor protection. Investor protection has several dimensions. First, there are different types of investors, such as creditors and shareholders. Creditors hold the primary claims on the firm's assets, while shareholders hold the secondary, or residual, claims.

Two finance and governance issues highlight the importance of stakeholder legal protections. Various stakeholders have divergent interests and capabilities; in broad terms, we can caharacterize some stakeholders as firm insiders and others as firm outsiders. Insiders, by definition, possess information about the firm that is not publicly available. If firm insiders have an economic interest in the firm, outside investors are at risk of being exploited when trading financial claims with insiders if they do not recognize the information asymmetry they face.

Asymmetric information and lack of enforceability of property rights are likely to cause underinvestment. When property rights are not enforceable, opportunistic behavior abounds. Opportunistic behavior leads to a redistribution of existing claims, which has no serious welfare implications in the first instance. However, when opportunistic behavior is anticipated, there will be negative welfare implications. The party that anticipates the possibility of being "held up" (exploited due to weak bargaining power) hesitates to trade. Similarly, asymmetric information, if anticipated, leads to underinvestment, because the party with inferior information hesitates to trade. In this way, information asymmetries can lead to risk premiums, which manifest themselves in wide bid and ask spreads. More generally, information asymmetries open a wedge between the potential buyer's willingness to pay and the potential seller's willingness to accept an offer (Milgrom and Roberts, 1992).

The second issue relates to incentive conflicts arising directly from the firm's capital structure. When a hitherto all-equity financed firm issues debt, the shareholders effectively sell the firm to the creditors. At the same time, the creditors effectively issue a call option on the firm's assets to the shareholders. Exercising this call option is tantamount to reclaiming the firm's assets by paying down the debt (principal plus interest). Default is the option of the shareholders to walk away from the firm, leaving its assets in the hands of the creditors.

Both problems highlighted here imply that different types of investors have different incentives. Creditors, for instance, prefer low-risk projects because they share in the negative outcomes but not in the positive ones. This is because creditors' returns can be less than promised, but not more. The shareholders, on the other hand, prefer greater risk. Recall that shareholders hold a call option on the firm's assets. All else equal, the more volatile the underlying asset is, the more valuable is the call. Thus, while creditors prefer low risk, shareholders prefer high risk (Hart, 1995).

In order to internalize the consequences of decision-making at the firm level, shareholders hold both the residual cash flow rights and the residual control rights over the firm's assets. Thus, in order to protect the creditors from being held up by the shareholders through excessive risk-taking, debt covenants

and other instruments are installed to restrict the shareholders' choice set. Yet, such measures are imperfect and costly and fail to achieve the first-best situation in which creditors are not exposed to potentially opportunistic behavior of the shareholders. Moreover, in times of financial distress, the conflict between the shareholders' interests and the creditors' interests is particularly pronounced. Situations of debt overhang and asset substitution abound—with adverse welfare implications (Brealey and Myers, 2000).

La Porta et al. (1998) argue that civil law countries, such as Gemany and France, tend to have weaker shareholder protection than common law countries, such as the United Kingdom and the United States. As a result of poor shareholder protection, civil law countries tend to have thin stock markets. Also, shareholder concentration in publicly traded firms tends to be higher in civil law countries than in common law countries. Concentrated shareholders become firm insiders; this is a way to overcome the asymmetric information problem. Also, only large shareholders have an incentive to exercise shareholder control. In common law countries, on the other hand, small shareholders are better protected and therefore don't need to exercise control to ensure adequate returns on their investments.

One aspect of civil-law countries that appears to be superior to common law countries is their ability to provide durable intertemporal smoothing contracts (Allen and Gale, 1995, 2000). Contracts offered by financial intermediaries such as depository institutions, insurance companies, and pension funds smooth consumption risk by providing returns that differ systematically from current-period returns in spot markets. That is, the institution can commit to paying a "smoothed" or averaged return by building up surpluses (or accumulating deficits) on its balance sheet and distributing them gradually to members or policy holders. In this way, no particular generation is unduly disadvantaged by retiring at the "wrong" time. A financial system with robust intertemporal and intergenerational risk-sharing mechanisms may also be more resistent to devastating asset-market crashes.

There is, of course, an incentive for any generation of members to break intertemporal contracts when accumulated surpluses are large. The market power of financial intermediaries in civil-law countries appears to counteract these incentives. A financial-markets oriented financial system, on the other hand, may be unable to sustain such welfare-enhancing arrangements as defined-benefit pension plans or annuities. For example, there has been strong pressure to "demutualize" many mutually owned savings and insurance associations in the English-speaking countries during recent decades in order to unlock the accumulated surpluses that had built up over generations.

III. Corporate Finance and Corporate Investment

For the period 1900-2001, Dimson, Marsh and Staunton (2002, p. 52) report an average annualized return on U.S. stocks of 6.7 percent after inflation adjustment. This average annualized return accelerated to 7.4 percent during the last 75 years of the 101-year period, to 8.2 percent during the last 50 years, and to 10.2 percent during the last 25 years. The magnitude of these stock market returns is astounding when compared to the average annualized rates of return on default-risk free securities. Government bills returned only an average annualized 0.9 percent for the period 1900-2000, while long-term U.S. government bonds returned an average 1.6 percent, inflation-adjusted.

What is a "reasonable" expected return? Gordon (1962) showed that the maximum long-term return stock investors reasonably can expect is the sum of the dividend yield (that is, ratio of the sum of annual dividend payments and net share repurchases to stock market value) and the rate of dividend growth. These two components correspond to the current cash payments investors receive (say, two percent of invested capital) plus the average annual increment to that payment (say, three percent). Note first that the rate of dividend growth cannot exceed the rate of growth of the economy overall, at least not indefinitely. A reasonable expected inflation-adjusted return on stocks in excess of 10-year government bonds for the period 1926-2000 was in the neighborhood of 2.4 percent. This number—which was

calculated by Arnott and Bernstein (2002)—stands in sharp contrast to the actual, or realized, excess return on stocks—the realized equity risk premium—of around 5 percent per annum.

Figure 1 shows the market-to-book value of equity of the U.S. nonfarm, nonfinancial corporate sector beginning in 1952. A high market-to-book ratio can be interpreted in three ways; only one of these three interpretations represents an equilibrium state. First, the sharp appreciation of the market-to-book ratio of equity during the 1980s and 1990s may reflect intangible capital that is not represented on the firm's balance sheet. Second, the corporate sector may be overvalued in the stock market—that is, stock prices are so high that the reasonable real rates of return discussed above are not achievable—, which would represent a disequilibrium situation. Third, the market-to-book-value of equity, which is closely related to Tobin's q, may reflect unusually favorable investment opportunities.

The first explanation—a large increase in intangible capital—is plausible, but it is difficult to prove independently of the appreciated market values we are attempting to explain. Under the presumption that organizational and technological knowledge is unlikely to be significantly more important today than it was yesterday, this explanation is not terribly compelling. As for the possibility of many new investment opportunities suddenly becoming available, finance theory suggests a firm should expand if (and only if) the value of its marginal Tobin's q is below one. An appreciation of the market-to-book value then would mean that the U.S. corporate sector underinvested in the late 1990s. This interpretation is difficult to reconcile with the data, however, as business investment was very strong. Consequently, the dramatic rise in the market-to-book value of equity simply may reflect overvaluation of the U.S. corporate sector.

The possibility of increasing overvaluation of the U.S. corporate sector during the 1990s has important implications for the U.S. economy. As the equity of U.S. corporations appreciated, the borrowing capacity of the corporate sector increased. Companies easily could take on more debt, using their inflated asset values as collateral. When these assets started to depreciate in March 2000, leverage ratios in the corporate sector increased sharply and borrowing capacity dropped.

At the time of writing, the U.S. economy is characterized by excessive leverage at three levels: the corporate level, the household level, and the national level. Households are highly leveraged both because the rising stock market encouraged greater consumption and because a brisk appreciation of home equity during the late 1990s and early 21st century provided greater borrowing capacity. A wave of mortgage refinancing effectively loosened the liquidity constraints facing many U.S. households.

It should be remembered also that the United States is a large borrower vis-à-vis the rest of the world on a per-capita basis—a result of many years of current-account deficits. The net foreign-investment position of the United States vis-à-vis the rest of the world was a negative $2.3 trillion at the end of 2001 (over 20 percent of GDP, measured at market values), almost $10,000 per U.S. citizen. Net holdings of credit-market instruments—including Treasury, agency, and corporate bonds plus commercial paper, that is, fixed-income claims rather than equity—represented virtually all of that amount. Portfolio equity investments and direct (equity) investments held by U.S. residents abroad are nearly equal to foreign residents' holdings of U.S. equities and direct investments. Thus, the net foreign-investment deficit indeed represents an ongoing debt-service obligation owed by U.S. residents.

Leverage is a risky bet—the riskier the project, the more valuable the financial claim of the party in control of the assets, all else equal. In other words, high leverage is a big bet leaving little room for error. This high-risk situation is the most significant characteristic of the U.S. economy today.

IV. The Stock Market and Fixed Investment [1]

A recurring topic of debate among central bankers and academic experts is the role of financial markets in cycles of boom and bust in the real economy. This discussion has flared up once again in the wake of the recent economic slowdown. The performance of the U.S. economy in the 1990s was remarkable, as was the performance of the stock market. Starting in April 2000, both the stock market and real economic activity weakened considerably. In the real economy, we observed a sharp drop-off in private business fixed investment. In the financial sector, we witnessed the stock market delivering

disappointing returns for two consecutive years. The number of initial public offerings—or IPOs—fell dramatically, and the market for venture capital dried up.

The link between the real economy and the financial sector is currently most visible in the telecommunications industry. Between April 2001 and March 2002, eight major telecommunications services providers went bankrupt; the total pre-bankruptcy book value of assets of these companies amounted to about $55bn. (The bankruptcy of Worldcom in July 2002 nearly doubled this amount.) It is noteworthy that all eight of these corporations went public between 1990 and 2000, a time when the telecom sector enjoyed spectacular growth rates. Between 1990 and 2000, private fixed investment in communications equipment as a share of GDP increased by 52 percent, adding 0.41 percentage points (41 basis points) to GDP growth during this period. In comparison, during the prior 30 years the share of investment in telecom equipment in GDP grew by only 33 basis points. As the telecom industry expanded, the stocks of telecom services providers and equipment makers were in high demand. From December 1990 through March 2000, the Nasdaq Telecommunications Index increased by more than 816 percent, compared with an increase of 317 percent in the Wilshire 5000 Stock Market Index. Then, in April 2000, the Nasdaq Telecommunications Index began a steep decline in which it shed about 75 percent by the end of January 2002. By comparison, the Wilshire 5000 Price Index dropped only 26 percent over the same time period.

The parallel performance of the telecom industry in the real economy and in the stock market raises several questions about the interaction between financial markets and the real sector. Were the financial markets driving the boom and subsequent bust in the telecom industry? What does the interaction between the real economy and financial markets imply for the efficiency of resource allocation?

Market Sentiment

The history of banking and financial markets is littered with bouts of investor optimism that have led to extraordinary and temporary appreciation of financial and real assets. Famous asset-price bubbles include the Dutch "tulip mania" of the 1630s, the first British railway boom of the mid-1840s, and the

bubble in Argentine loans in the 1880s, to name but a few. Recently, the field of behavioral finance has begun to investigate market sentiment and other investor biases in more detail (Shleifer, 2000).

Asset-price bubbles start with good news and substantial profits for early investors in the boom. For instance, the 17th-century tulip mania had its origin in a mosaic virus, which generated interesting-looking tulips that fetched high prices among tulip growers. Because the virus-infected tulip bulbs were difficult to reproduce, they appreciated sharply. This generated a windfall profit among those who happened to own them. The initial capital gains sowed the seeds for overly optimistic expectations of the profitability of growing and trading these strains of tulip bulbs. There are reports of extensive trading in derivative contracts written on tulip bulbs. Eventually, the formerly interesting-looking tulips lost their appeal and the price of the erstwhile highly valued bulbs fell, ending the speculative bubble.

The British railroad boom was unleashed by a major technological advance. There was not only excitement about the new means of transportation, but the British also welcomed the economic stimulus of the railroad boom because it marked the end of a period of economic depression.

The bubble in Argentine loans in the 1880s began with increased demand in the world market for Argentine agricultural products. This led to an economic boom in Argentina, which gave the Argentine government easy access to the world debt market. Argentina also raised equity capital through initial public offerings of corporations that specialized in developing land. When one of these IPOs failed in 1888, the Baring Brothers helped out with credit. Two years later, the Argentine government failed to meet these debt obligations because of falling prices for raw materials in the world markets. This led to the famous Baring crises, which gave rise to an early example of the central bank—in this case, the Bank of England—acting as a lender of last resort.

All three bubbles—and history has recorded many more—started with good news that created high hopes that eventually ended in tears. In general, bubbles are driven by positive market sentiment, that is, widespread and excessive investor optimism. Positive market sentiment gives rise to a sharp appreciation of asset prices, which eventually regress to their fundamental values. Regression to the

fundamental value is often followed by unwarranted asset depreciation as market sentiment turns overly negative. Hence, market sentiment causes both asset mispricing and excessive volatility.

The consequences of asset mispricing and excessive volatility are not confined to financial markets, but also affect fixed investment and production. Financial markets are critical for directing scarce resources to their most productive use. The efficiency by which financial markets achieve this goal depends on the accuracy of the prices that financial markets signal to investors. The price signals of the stock market allow corporations to calculate their cost of equity capital and to evaluate the profitability of potential projects.

In his seminal book, *A General Theory of Employment, Interest, and Money*, John Maynard Keynes discussed several factors that bear on the accuracy of the stock market's price signals. He recognized an important role for the stock market in guiding investment and stimulating growth. In brief, Keynes hypothesized that market sentiment is carried into financial markets by uninformed investors, causing mispricing and excessive volatility. Although it appears that mispricing and the ensuing excessive volatility offer arbitrage opportunities for informed investors, arbitrageurs may be unable to exploit these opportunities due to liquidity constraints. Clearly, if informed investors were able to exploit these arbitrage opportunities, the opportunities would not be there in the first place.

In a 1981 study, Yale University economist Robert Shiller showed that the valuation of the U.S. stock market exhibits pronounced fluctuations around its fundamental value, defined as the discounted value of future dividends. Multi-year periods of stock market overvaluation alternate with equally extended periods of stock market undervaluation. An example of a period of bearish market sentiment was the early 1970s, when the four-quarter trailing price-to-earnings ratio of the S&P 500 stock price index was as low as 7. During the late 1990s, on the other hand, the trailing P/E ratio climbed well above 30. This was remarkable because corporate profits (the denominator of the ratio) were rising; the P/E ratio subsequently rose even further when earnings dropped beginning in late 2000. Such an elevated stock market valuation might be viewed as excessively optimistic, given that the median value of the postwar P/E ratio in the S&P 500 was around 15.

The Limits of Arbitrage

Recognition of market sentiment as a potent force in financial markets warrants the question, why don't arbitrageurs bet against it? This question needs to be answered before one accepts the possibility of stock market overvaluation (or undervaluation, for that matter) and its implication for the allocation of resources.

Keynes attributes the persistence of asset mispricing and excessive volatility to a lack of liquidity. This is another way of saying that there is a dearth of traders who lean against the prevailing market sentiment. Why don't arbitrageurs—hedge funds, for instance—put on aggressive trades that push the market back to its fundamental value?

There are two answers to the question of why arbitrageurs do not bet aggressively against market sentiment (Shleifer, 2000). First, arbitrageurs have limited wealth and limited time horizons. Asset prices might take a long time to regress to their fundamental value. Worse yet, asset mispricing might even deepen along the road. Furthermore, rare events—such as an "overvalued" stock market rising strongly, or an "undervalued" market crashing—can and do happen more often than is predicted by standard models such as the "value at risk" (VaR) approach (Scholes, 2000). In the meantime, arbitrageurs who invest their own money might develop liquidity needs as they near retirement. Also, hedge funds might be faced with withdrawals as investors become impatient and start doubting the arbitrageur's talent as gains are long in coming and losses mount. As Keynes remarked, "Markets may stay irrational longer than you remain solvent." There is also the old stock market adage that a man can lose his shirt betting on fundamentals.

Another reason why informed investors might not bet aggressively against the prevailing market sentiment is uncertainty about the assets' fundamental values. Even the most sophisticated investor cannot rule out the possibility that the way he looks at financial markets is inadequate. The Nobel Prize-winning economists who helped run Long-Term Capital Management could not prevent a meltdown of the hedge fund during September 1998 when completely unexpected market movements undermined their precisely calibrated trading strategies. This unknowable complexity is termed Knightian uncertainty

(Knight, 1921). The possibility that the world in which we live is not well charted, if recognized, leads informed investors to tread cautiously when putting on their trades.

The Recent Spell of Bullish Market Sentiment

A compelling object of study for the interaction between financial markets and the real economy is the market for initial public offerings (IPOs). In countries with sophisticated financial markets, periods of excessively optimistic market sentiment tend to be accompanied by extraordinarily strong activity in the IPO market. During these so-called "hot issue" markets, the vast majority of companies going public have been established only recently and they operate in the very industries that are exciting the exuberant investors.

Hot issue markets are characterized by high volume, unusually high returns on the first trading day—known as "initial returns"—and very poor long-run performance in the secondary market. Empirical evidence for long-run underperformance of initial public offerings in the wake of hot issue markets was provided in a seminal study published by Jay Ritter in 1991. Hence, the poor performance of initial public offerings in the secondary market was public knowledge long before the frantic IPO activity in the U.S. stock market during the late 1990s, yet the initial public offerings with the highest initial returns during the hot issue market of the late 1990s were (predictably) among the worst-performing stocks in the secondary market. From 1998 to early 2000, the top ten IPOs—ranked by initial return—climbed between 400 and 700 percent on the first day of trading. As of August 2001, nine of these ten stocks had depreciated by at least 80 percent; one stock was delisted after a competitor acquired the company.

The recurrence of hot issue markets leads to the question of why history repeats itself in such an obvious manner. Academia has tried to find an answer to this puzzle by devising the concept of the noise trader—a concept that is related to Keynes' notions of uninformed investors and speculators. Noise traders are unable to separate information from noise, forming erroneous beliefs about the fundamental value of financial assets. Successive generations of noise traders fall prey to the same old fallacies.

The first academic treatment of noise traders in financial markets was a 1953 paper by Milton Friedman. Friedman assumed that the beliefs of noise traders are idiosyncratic. Noise traders, because they trade both on information and noise, trade excessively. The introduction of noise into asset prices makes these assets riskier than they would be otherwise. However, if noise traders' beliefs are idiosyncratic, noise trader risk can be eliminated through diversification, and hence the risk is not priced. Consequently, noise traders do not distort asset prices in a sustained manner. Also, because noise traders trade on erroneous beliefs, they tend to lose money when trading with informed investors and they eventually throw in the towel. Sure enough, there are always pockets of noise traders in financial markets as new noise traders keep entering the market, and some noise traders return with fresh funds.

Half a century after Friedman's paper, the academic view of noise traders is less sanguine. Given the empirical evidence we have today, we recognize noise traders as a potent force in financial markets. Noise traders matter because their beliefs might be systematic, rather than idiosyncratic. Just think of the recurrence of hot issue markets and the aforementioned rise and fall of telecom stocks. To be sure, these are phenomena that are driven by systematic errors in the beliefs of large groups of investors—a manifestation of market sentiment. Informed investors, for the aforementioned reasons, yield to market sentiment rather than betting aggressively against it. This way, market sentiment "creates its own space," obtaining the capacity to distort asset prices in a sustained manner. Noise-trader risk becomes a source of systematic risk because the informed investors are unable to eliminate it through diversification.

A valuable gauge of market sentiment in the stock market is the P/E ratio. In March 2000, the Nasdaq 100—which accounted for more than 10 percent of the U.S. stock market—traded at a P/E ratio of about 100. Certainly, there have always been a handful of stocks that trade at elevated levels. However, when 10 percent of the entire market trades at such a lofty level, some questions might be in order. Chan, Karceski, and Lakonishok (2001), who study the earnings growth rates of U.S. corporations, drew up the following examples. Assume the P/E ratio of a company takes ten years to revert from 100 to 20, which is still a fairly generous level given that historically the P/E ratio of the S&P 500 has averaged

16. If we assume that the annualized real return on this stock over the next ten years is zero, then the company's real earnings have to grow at an annualized rate of 17.5 percent. Alternatively, if the investor demands an annualized 10 percent real return on the stock over the next ten years, the real earnings of this company have to grow by an average 29.2 percent per year. Of course, it was illusory to assume that the companies that comprise the Nasdaq 100 would average such growth rates in real earnings. At the same time, the returns expected by avid investors in these companies were most likely not as modest as assumed in the numerical examples.

Investors are willing to hold stocks with high P/E ratios if they expect these companies to grow at an above-average rate. Given that investors disagree about which companies will be the fast-growing ones, many companies may trade at elevated prices at the same time. This brings us to the question of how predictable earnings growth at the company level really is. Chan, Karceski, and Lakonishok (2001) show that there is virtually no predictability of earnings growth rates at the company level at the five- and ten-year horizons. Thus, it is no more likely to pick the next Microsoft from the population of fast-growing companies through rational deliberation than by chance.

The unpredictability of earnings growth was known long before the Nasdaq 100 traded at a P/E ratio of 100. Keynes wrote in the *General Theory*: "The outstanding fact is the extreme precariousness of the basis of knowledge on which our estimates of prospective yield have to be made. Our knowledge of the factors which will govern the yield of an investment some years hence is usually very slight and often negligible. If we speak frankly, we have to admit that our basis of knowledge for estimating the yield ten years hence of a railway, a copper mine, a textile factory, the goodwill of a patent medicine, an Atlantic liner, a building in the City of London amounts to little and sometimes to nothing; or even five years hence." Given that there is no predictability in earnings growth beyond the very short horizon, it is not surprising that stocks with high P/E ratios tend to underperform the market, as many academic studies have shown.

Before returning to the link between stock market valuation and resource allocation, it is important to be more specific about noise traders. It might appear an easy way out to blame asset

mispricing and excessive volatility on anonymous noise traders. Who are these noise traders, anyway? Typically, when we think of noise traders, we think of small investors. Admittedly, small investors may play a bigger role in the stock market than in the market for Treasury securities. But consider this little-appreciated fact: the real yield to maturity on 10-year Treasury inflation-indexed securities—the safest security in the world—reached a high of 4.42 percent in January 2000. This astonishingly high yield is difficult to reconcile with historical returns or prospective risks. For instance, the inflation-adjusted buy-and-hold return on long-term U.S. government securities between the end of 1925 and the end of 2000 averaged only about 2.2 percent per annum (Ibbotson and Associates, 2002)—half the January 2000 level. During the same 75-year time period, real GDP grew at an annualized rate of 3.16 percent. Given that Treasury inflation-indexed securities contain no inflation risk and should yield less than the historical average of long-term nominal bonds less inflation, a yield of 4.42 percent is astoundingly optimistic. The point is that institutional investors, who hold the bulk of the Treasury inflation-indexed securities, appear to have been overly optimistic about the growth prospects of the economy at that time, also. This points to the conclusion that swings in market sentiment affect not only small investors, but institutional investors, as well.

Stock Market Valuation, Investment, and Growth

In the 1990s, the issuance of excessively valued stocks, along with an overvaluation of existing securities, led to an appreciation of the U.S. stock market that makes the run-up to the September 1929 market peak look like a hiccup. The median annual ratio of stock-market valuation to nominal GNP in the period 1920 to 2000 runs at 48 percent. Between 1990 and the first quarter of 2000, this ratio increased from its median value to an unprecedented 186 percent. By comparison, in the third quarter of 1929, the ratio of stock market valuation to GNP amounted to only 68 percent. The historic peak before the run-up of the 1990s was recorded in the fourth quarter of 1972 at a value of 78 percent.

Certainly, such excessive stock market valuation leaves its mark in the real economy. By depressing the cost of capital, the stock market appreciation of the 1990s fuelled the longest investment boom in postwar history. From a trough in the first quarter of 1990, the fraction of fixed private

nonresidential investment in (nominal) GDP increased from 9.7 percent to a peak value of 13.2 percent in the third quarter of 2000. By comparison, the median postwar value was 10.5 percent.

As a result of the investment boom, the real capital stock of the economy expanded sharply. After hitting a trough in 1992 at 1.5 percent, the rate of increase in real capital stock climbed steadily to 4.2 percent in 2000. When the economy slowed, it became evident that a capital overhang had developed. In the fourth quarter of 2000, nonresidential business fixed investment recorded its first decline in nine years. Although the decline was a modest 3.2 percent at an annual rate, it initiated a string of seven consecutive quarterly declines through the second quarter of 2002. Investment in information processing equipment and software was hit particularly hard, declining in each quarter of 2001. The level of real investment in information processing equipment and software was 10.5 percent lower during the fourth quarter of 2001 than it had been a year earlier—representing the sharpest four-quarter decline during the 40 years for which data are available. As estimated by President Bush's administration (Council of Economic Advisors, 2002, p. 41), the growth rate of real capital stock dropped to 2.6 percent during 2001 as a whole.

Like other investment booms in history, the rapid expansion of the capital stock in the 1990s followed on the heels of a major technological advance—the digital revolution. In the early stages of the boom in computers and communications, there were extraordinary corporate success stories as epitomized by the rise of Microsoft. On the financial side, these admirable corporate achievements were reflected in equally impressive capital gains in the stock market. The new technology, which gave rise to new, fast-growing corporations, created expectations of a "new era" in the real economy and high returns in the stock market. During a boom, investors rarely remember Schumpeter's dictum of creative destruction—namely, that the benefits of technological advances are passed on to the consumer. This is the nature of competition. Busts are the inevitable consequence of mean-reverting rates of growth and of the erosion of corporate profits through competition.

Clearly, no company can produce an earnings growth rate that exceeds the growth rate of potential GDP forever. Inevitably, earnings growth rates of individual companies revert toward the mean

of all companies' growth rates; otherwise, this fast-growing individual company eventually would become larger than the economy itself—an impossibility. Against this background, a P/E ratio of 100 in the Nasdaq 100 is difficult to explain without some kind of new-era thinking. There is a risk in new-era thinking because it is an attempt to rationalize, rather than explain, high stock-market valuation. Although the productivity growth of the U.S. economy has been impressive over the last couple of years, including the most recent period of recession, bursts of productivity growth have happened before—for instance, during the 1960s and mid-1980s. More importantly, past technological innovations had no lasting impact on the growth rates of corporate earnings. In fact, the median share of corporate profits in GDP in the 1990s ran at 8.2 percent, which was 1.3 percentage points lower than the postwar median value of 9.5 percent.

Over the last couple of years, the decline in corporate profits has been accompanied by a rise in corporate leverage. The ratio of total liabilities to net worth for nonfarm nonfinancial corporations soared from a recent trough of 94 percent during the fourth quarter of 1997 to a near-record 113.2 percent during the first quarter of 2002. By comparison, the median postwar value is only 63.8 percent. Note also that this figure understates the actual rise of debt obligations at the company level because of the increased use of leasing and the proliferation of special (off balance sheet) financing vehicles.

The rise of corporate indebtedness is in part a consequence of the soaring stock market of the 1990s. As the market values of firms' equity appreciated, their borrowing capacity increased. Corporations that dipped deeply into their borrowing capacity in the days of the boom found themselves highly leveraged after their equity depreciated in the stock market. Excessive use of debt, along with overcapacity, has contributed significantly to the current wave of bond defaults and bankruptcies—in particular in the telecom sector. Another implication of high leverage is the increased share of interest payments in current income. At a time of tightening lending standards and debt downgrades in the bond market, high debt obligations might put a drag on capital spending as corporations find it difficult to finance investment projects out of current cash flow.

V. Monetary Policy and Fixed Investment

The Federal Reserve is an important link between the financial sector and the real economy. Legally, the Federal Reserve has two important mandates. The Federal Reserve must conduct monetary policy in a way that encourages both low inflation and high employment. High employment is usually interpreted as a high rate of economic growth.

Despite its clear legal mandate(s), how the Federal Reserve should operate monetary policy is not at all clear. This is because the Federal Reserve has only one instrument, which is the short-term interest rate or the money supply, depending on the analytical perspective chosen. From control theory, it is known that with one instrument, the time path of only one target variable can be controlled if the variables are independent. In other words, the Federal Reserve might not be able to pursue simultaneously the goals of low inflation and high economic growth. Clearly, the conflict between the two mandates might be more or less pronounced at a given time, depending on the economic situation.

The preferences of the Federal Reserve, or which goal it feels is more important, are revealed most clearly when there is a conflict in pursuing the two goals. In a seminal study of monetary policymaking in practice, John Taylor (1993) estimated the response function of the Federal Reserve to deviations of the rates of inflation and real GDP growth from target levels. While Taylor's study was descriptive analysis, the response function he estimated often is interpreted in a normative way—that is, his empirical model has become "the Taylor rule."

As a descriptive rule, it is not surprising to see the Federal Reserve trying to strike a balance between the goals of high employment and low inflation. In the end, the loss function of society is likely to contain terms for both the rate of inflation and the rate of economic growth. On the other hand, when looked at from a normative perspective, it is not clear what we learn from the Taylor rule. First, was the Federal Reserve's past policy necessarily optimal? If the Taylor rule is used for policy-making, this question would have to be answered yes. Second, if Federal Reserve policy was optimal in the past—that is, at a time when the Taylor rule was unknown—, why does the Federal Reserve need the Taylor rule

today to make optimal policy decisions? At best, the Taylor rule makes explicit something that the Federal Reserve already knows how to do, and has done in the past. One such insight would be that the Federal Reserve has to increase interest rates by more than the increase in the expected rate of inflation. This simply results from the fact that otherwise, the real rate of interest, which is the nominal rate minus the expected rate of inflation, would decrease despite a fed-funds rate hike.

Monetary Policy and the Economy

In the following, we focus on the link between the Federal Reserve's operation of monetary policy and the real economy. As noted above, the Federal Reserve's policy instrument is the short-term interest rate or, more specifically, the federal funds rate. Common wisdom states that the Federal Reserve should cut the fed funds rate when trying to stimulate the economy, and raise the rate when it tries to slow the economy.[2]

When the Federal Reserve tries to stimulate or slow economic activity, it aims at economic activity that is sensitive to interest rates. The components of GDP considered most responsive to interest rate changes are business fixed investment, housing investment, and purchases of consumer durable goods. (Purchases of consumer durable goods might be viewed as household investment decisions similar to business fixed investment or housing.) In the following we consider all forms of investment as similar for analytical purposes.

Conventional wisdom holds that the short-term interest rate itself is a powerful instrument in influencing investment decisions. From a theoretical perspective, however, the link between short-term rates and investment is anything but clear. To appreciate this ambiguity, one must consider the impact of monetary policy actions (rate cuts or hikes) on the term structure of the yield curve (or the term structure of interest rates). [3] For it is the real yield curve—that is, the inflation-expectations adjusted yield curve—that matters for long-lived investment decisions.

First, it is not obvious how monetary policy actions impact the level and slope of the yield curve, save for its certain impact on the short end. Secondly, it is not all that clear how changes in the level or the slope of the yield curve affect incentives to undertake fixed investment.

Consider the "simple NPV" (net present value) rule found in any introductory finance textbook. An investment project should be undertaken if and only if the net present value of the project is positive:

$$\text{NPV} = \sum_{t=1}^{T} \frac{CF_t}{(1+R)^t} > 0 \quad ,$$

where CF is the cash flow and R is the discount rate, both in nominal terms.

The discount rate, R, represents the opportunity cost of capital. An important extension of the Modigliani-Miller theorem states that the discount rate is independent of the company that pursues the project (Bodie and Merton, 2000). Rather, the discount rate is solely determined by the project's *beta*, that is, the project's contribution to the market risk. The standard textbook decision rule implicitly assumes that the project under consideration does not compete with any other project.

It is now well established in the finance literature that the net present value rule may lead to incorrect decisions if projects can be delayed, that is, if projects "compete with each other in time." This is because there might be value of waiting due to uncertainty about the future opportunity cost of capital. Simply put, the value of waiting arises from the possibility that the same project (that is, a project with identical cash flows) might be carried out at a lower opportunity cost of capital some time in the future.

To illustrate the point, compare the following two projects. The projects offer identical cash flows (in "project time"). The only difference between the projects is the point of time at which each is launched. For the project that is launched today, the NPV is

$$\text{NPV}_{0,0} = \sum_{t=1}^{T} \frac{CF_t}{(1+R_0)^t} \quad ,$$

where the subscripts on NPV refer to today's date and the date of project launch, respectively. Compare $\text{NPV}_{0,0}$ with the NPV of a project that is launched one period later:

$$\text{NPV}_{0,1} = \frac{1}{(1+r_{0,1})} \cdot \sum_{\tau=1}^{\text{T}} \frac{CF_\tau}{(1+R_1)^\tau} \quad ,$$

where $\tau = 1,...,\text{T}$ indicates project time (rather than calendar time). Project time starts at $\tau = t-1,\ t=1$, because the first cash flow does not appear until the end of the first period of operation. The discount rate, $r_{0,1}$, is the one-period risk-free rate of return. The rate R_1 is the opportunity cost of capital as observed at $t=1$, that is, one period from now.

Assume, for simplicity, that the cash flow stream CF_τ $(\tau = 1,...,\text{T})$ is independent of whether the project gets started this period (at $t=0$) or the next period (at $t=1$). Then the only unknown variable in the decision of when to invest (if at all) is the opportunity cost of capital that will prevail at time $t=1$, R_1. The uncertainty about the opportunity cost of capital one period from now creates a call option—that is, the option to wait.

Berk (1999) investigated this problem and derived the correct decision rule for "delayable" projects—a decision rule that incorporates the option of waiting. Berk derived his formula for the special case of a stream of constant periodic cash flows. Berk shows that the correct decision is to invest if and only if:

$$\sum_{\tau=1}^{\text{T}} \frac{CF_\tau}{\left(1+\frac{r_0^m}{r_0}R_0\right)^\tau} > 0 \quad ,$$

where r_0^m is the callable risk-free rate with a time to maturity that matches the last cash flow of the project, and r_0 is the duration-matched (noncallable) risk-free rate of return. The callable rate exceeds the noncallable rate because the former includes compensation to the lender for the embedded prepayment call option. Thus, the discount factor in the modified formula is always larger—hence, the present value is smaller—than in the original NPV formula. The Berk decision rule for projects that can be delayed and have no resolution-of-uncertainty problem with respect to cash flows illustrates the positive value of

waiting. Berk's initial assumption about nonstochastic cash flows can be relaxed. Then, the variable R_0 is simply the opportunity cost of capital that would be applied otherwise in the simple NPV decision rule.

Berk points out that the term $\frac{r_0^m}{r_0} R_0$ is an unambiguous measure of the private sector's incentive to invest. If monetary easing succeeds in lowering this discount rate, then the incentive to invest increases unambiguously. In this case, monetary policy has stimulated investment. Otherwise, the incentive to invest decreases and monetary policy has been contractionary. Clearly, this holds for a fixed set of expected cash flows.

Unfortunately, implementing the formula is not as straightforward as suggested by Berk. This is because the formula rests on real (that is, inflation-adjusted) variables, which means that it holds only in a world of no inflation (and consequently no inflation risk). Suppose we were in such a world and implemented the Berk formula. Then, the variable r_0^m is a callable risk-free rate of return as exemplified by the rate of return on GNMA (Government National Mortgage Association) mortgage-backed securities. GNMA securities are free of default risk (because they are backed by the full faith and credit of the U.S. Government) and are callable (because the underlying mortgage borrowers can prepay their mortgages). The variable r_0, on the other hand, is the duration-matched noncallable rate. For instance, for a 30-year project, the GNMA 30-year on-the-run yield can be matched with a 10-year on-the-run Treasury note, which has approximately the same duration.

A somewhat more difficult task is to quantify the opportunity cost of capital, R_0. The opportunity cost of capital consists of the risk-free rate of return and a risk premium that captures the *beta* of the project's cash flow with respect to the market. The market comprises the population of all projects in the economy, as represented by the population of financial claims. When written in additive form, R_0 equals the sum of the risk-free rate of return, r_0, and a risk premium, ρ—the equity risk premium.

As noted, Berk's decision rule holds only for an economy without inflation or inflation risk. This is because the formula is derived for a time-invariant stream of cash flows, CF_τ $(\tau = 1,...,\mathrm{T})$ with

$CF_\tau = \overline{CF}$ for any $\tau = 1,...,\mathrm{T}$. Clearly, this assumption is adequate only in a world of no inflation. Otherwise, the size of the project would decrease over time if the rate of inflation is positive, and increase if the inflation rate is negative. In other words, it would not be the same project if it were started at a different point in time.

If cash flows are denoted in real terms, so must the opportunity cost of capital. This poses a problem, because there are no inflation-adjusted mortgage-backed securities in the United States. On the other hand, r_0 is observable from Treasury inflation-indexed securities (TIIS). In the following we derive an approximation of the Berk formula for a world with inflation and inflation risk.

In a world without inflation risk (or, equivalently, diversifiable inflation risk), the link between the nominal interest rate, i, and the real interest rate, τ, is given by the Fisher equation:

$$1 + \mathrm{E}[i] = (1 + \tau_0) \cdot (1 + \mathrm{E}[\pi]) \quad ,$$

where π is the rate of inflation and τ is known. The investor demands not only compensation for the expected rate of inflation, but also compensation for the inflation-risk premium.

If we assume that the inflation-risk premium is multiplicative (rather than additive—an assumption immaterial to the following argument), we can write

$$\rho = \frac{i - \pi \cdot (1 + \sigma)}{1 - \pi \cdot (1 + \sigma)} \quad ,$$

where σ is the inflation-risk premium. If we assume that the inflation risk premium is identical for the risk-free rate, r, and the callable risk-free rate, r^m, then we can write Berk's investment rule as follows:

$$\sum_{\tau=1}^{\mathrm{T}} \frac{CF_\tau}{\left(1 + \frac{r_0^m - \pi^{\mathrm{e}} \cdot (1 + \sigma)}{r_0 - \pi^{\mathrm{e}} \cdot (1 + \sigma)} (r_0 - \pi^{\mathrm{e}} \cdot [1 + \sigma] + \omega)\right)^\tau} > 0 \quad ,$$

where ω is the (real) equity risk premium. The opportunity cost of capital equals $r_0 - \pi^{\mathrm{e}} \cdot [1 + \sigma] + \omega$, which is the discount rate that would apply if there were no value of waiting. The value of the call (or

value of waiting) is reflected in the term $\frac{r_0^m - \pi^e \cdot (1+\sigma)}{r_0 - \pi^e \cdot (1+\sigma)}$. Note that the value of waiting always is greater than one, which does not imply, however, that waiting to invest is the optimal choice at all times (Ingersoll and Ross, 1992).

Clearly, the assumption that the inflation-risk premiums in callable and noncallable default-risk free rates are identical is somewhat restrictive. One might suspect that the inflation-risk premium is somewhat lower in callable bonds, because the call option insulates the issuer against declines in the expected rate of inflation. (Callable and noncallable bonds are equally affected by increases in the expected rate of inflation.) This means that assuming identical inflation-risk premiums for callable and noncallable rates will underestimate the true discount factor.

We now implement the Berk discount factor, $1 + \frac{r_0^m - \pi^e \cdot (1+\sigma)}{r_0 - \pi^e \cdot (1+\sigma)}(r_0 - \pi^e \cdot [1+\sigma] + \omega)$, under the assumption that the inflation-risk premium in callable rates is identical to the inflation-risk premium in noncallable rates. We choose the following variables:

r_0^m : 30-year current-coupon bond-equivalent GNMA yield

r_0 : 10-year constant maturity Treasury yield

$\pi^e \cdot (1+\sigma)$: 10-year constant-maturity Treasury yield minus 10-year on-the-run Treasury inflation-indexed securities yield

ω : real equity-risk premium (2.4 percent).

The estimate for the real equity-risk premium comes from Arnott and Bernstein (2002), who studied two centuries of U.S. stock market data. (We treat the equity-risk premium as a constant, assuming that the marginal investor is identical at all times, has stable risk preferences, and is not financially constrained.)

Figure 2 exhibits the discount rate of the corporate sector taking into account the value of waiting—a discount rate that unambiguously measures the incentive to invest in fixed assets. The figure also displays two of the components of the discount rate: The (nominal) effective federal funds rate and

the (nominal) 10-year Treasury yield. Figure 3 provides a graph of the value of waiting. Figure 4 shows an important element of the value of waiting, that is, the uncertainty about the future opportunity cost of capital as expressed by the implied volatility of options written on 10-year T-note futures. Note that the greater the uncertainty about the future opportunity cost of capital is, the greater is the incentive to delay the project, all else equal.

VI. Cost of Capital from an International Perspective

From 1982 through March 2000, the United States experienced an unprecedented bull run in the stock market. The realized excess returns on stocks have exceeded the equity-risk premium that reasonably could have been expected (rather than dreamt of) by a wide margin. The run-up in equity prices has wide-ranging implications for the future growth of the U.S. economy.

Arnott and Bernstein (2002) show that the "reasonable" expected equity risk premium fluctuated in a narrow range around zero between 1982 and 2000. Yet, as measured by the S&P 500, a broad stock-market index, the total buy-and-hold realized return on U.S. stocks (assuming all dividends and capital gains were reinvested) amounted to an annualized 16.9 percent (continuously compounded). American households experienced a windfall gain in equity wealth that some, or perhaps many, perceived to be a permanent addition to their wealth. However, according to analyses such as that of Arnott and Bernstein, the "fair" or sustainable value of the U.S. stock market (at the time of writing) might amount to only 25 percent of its current market value. The increase in market wealth led to a sharp drop in the saving rate of American households, and to overinvestment in the corporate sector. By decreasing the saving rate and increasing the rate of investment (see Emmons and Schmid, 2002), the United States attracted capital from abroad. As a result, the United States today is a highly indebted country vis-à-vis the rest of the world. Moreover, both the household and the corporate sectors are highly leveraged.

VII. Conclusion

This chapter has analyzed some of the background issues and ongoing implications of the economic and financial boom in the United States during the late 1990s. We discussed resource allocation and social welfare in the United States in the context of the boom. In particular, we focused on issues pertaining to corporate finance, corporate investment, the stock market, and monetary policy. Drawing on historical data and cross-country comparisons to evaluate current economic and financial structures in the United States, we concluded that there were several cracks in the façade of the great American boom during the late 1990s. The likelihood that the stock-market boom drove businesses and households to make unsustainable spending commitments leaves the future course of the U.S. economy in jeopardy. Federal Reserve monetary policy turned out, by at least one conceptually sound metric, not to have been very stimulative in the wake of the deflating boom. Whether the Fed's unprecedented prestige will survive the aftermath of the boom is highly uncertain.

[1] Part of the material in this section was prepared by one of the authors for William Poole, "The Role of Finance in the Investment Bust of 2001," delivered to the Annual Southwestern Finance Association Meeting, St. Louis, MO, March 8, 2002.

[2] Miller, Weller, and Zhang (2002) argue that the Fed also reacts to large declines in the stock market. Falling stock prices and potential weakness in economic activity often co-exist, however, so the existence of a 'Greenspan put' (systematic Fed support for stock prices) is difficult to prove.

[3] There is a difference between the yield curve and the term structure of interest rates. Yields are actual internal rates of returns (average rates of returns with coupon payments reinvested) observed in practice. The term structure of interest rates refers to the hypothetical rates of return that would be observed on zero-coupon securities traded in frictionless markets.

References

Allen, Franklin, and Douglas Gale, "A Welfare Comparison of Intermediaries and Financial Markets in Germany and the US," *European Economic Review*, 39, 179-209, 1995.

Allen, Franklin, and Douglas Gale, "Financial Markets, Intermediaries, and Intertemporal Smoothing," *Journal of Political Economy*, 105, 523-546, 2000.

Arnott, Robert D, and Peter L. Bernstein, "What Risk Premium is 'Normal'?" *Financial Analysts Journal*, 58, 64-85, 2002.

Bennett, Deborah J., *Randomness,* Cambridge (MA): Harvard University Press, 1998.

Berk, Jonathan, B., "A Simple Approach for Deciding When to Invest," *American Economic Review* 89, 1319-1326, 1999.

Bodie, Zvi, and Robert C. Merton, *Finance*, Upper Saddle River (NJ): Prentice Hall, 2000.

Brealey, Richard A., and Stewart C. Myers, *Principles of Corporate Finance*, New York: McGraw-Hill, 2000, 6th ed.

Chan, Louis K. C., Jason Karceski and Josef Lakonishok, "The Level and Persistence of Growth Rates," NBER Working Paper No. 8282, 2001, <http://www.nber.org>.

Council of Economic Advisors, *Economic Report of the President*, Washington, D.C.: GPO, 2002.

Dimson, Elroy, Paul Marsh and Mike Staunton, *Triumph of the Optimists*, Princeton (NJ): Princeton University Press, 2002.

Emmons, William R., and Frank A. Schmid, "The US Policy Mix and Corporate Strategies," in *American Macromanagement*, Paul Taylor, Alan Rugman, and Gavin Boyd, Editors, Cheltenham (UK): Edward Elgar, 2002, forthcoming.

Friedman, Milton , "The Case for Flexible Exchange Rates," in *Essays in Positive Economics*, Chicago: University of Chicago Press, 1953.

Gordon, Myron J., *The Investment, Financing and the Valuation of the Corporation*, Homewood (IL): Irwin, 1962.

Hart, Oliver, *Firms, Contracts, and Financial Structure*, Oxford (UK): Clarendon Press, 1995.

Ibbotson Associates, *Stocks, Bonds, Bills, and Inflation. 2002 Yearbook* (Chicago: Ibbotson Associates, 2002).

Ingersoll, Jonathan E. Jr., and Stephen A. Ross, "Waiting to Invest: Investment and Uncertainty," *Journal of Business*, 65, 1-29, 1992.

Keynes, John Maynard, *The General Theory of Employment, Interest, and Money*, New York: Harcourt, Brace & World, 1936.

Knight, Frank H., "The Meaning of Risk and Uncertainty," Part III, Chapter VII from *Risk, Uncertainty, and Profit*. Boston: Houghton and Mifflin, 1921, Online edition: <http://www.econlib.org/library/Knight/knRUP.html>.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny "Law and Finance," *Journal of Political Economy* 106, pp. 1113-55, 1998.

Milgrom, Paul, and John Roberts. *Economics, Organization and Management,* Englewood Cliffs (NJ): Prentice Hall, 1992.

Miller, Marcus, Paul Weller, and Lei Zhang, "Moral Hazard and the U.S. Stock Market: Analysing the 'Greenspan Put,'" *Economic Journal* 112, March, No. 478, pp. C171-86, 2002.

Poole, William, "The Role of Finance in the Investment Bust of 2001," 2002, <http://www.stls.frb.org/general/speeches/020308.html>.

Ritter, Jay, "The Long-Run Performance of Initial Public Offerings," *Journal of Finance* (46), March, vol. 46, No. 1, pp. 3-27, 1991.

Scholes, Myron R., "Crisis and Risk Management," *American Economic Review, Papers and Proceedings*, Vol. 90, p. 17-21, 2000.

Shiller, Robert J., "Do Stock Prices Move Too Much to be Justified by Subsequent Changes in Dividends?" *American Economic Review* 71, 421-436, 1981.

Shiller, Robert J., *Irrational Exuberance,* Princeton (NJ): Princeton University Press, 2000.

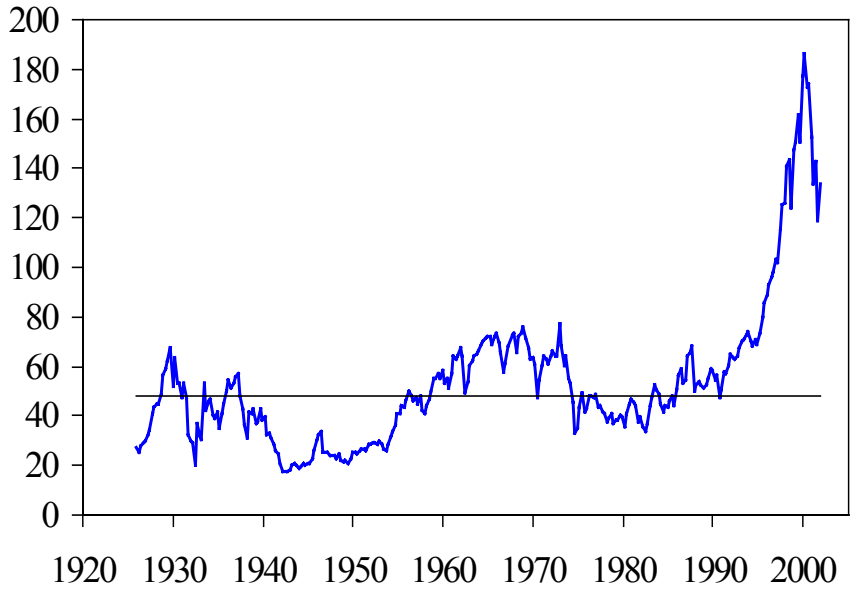
Shleifer, Andrei, *Inefficient Markets: An Introduction to Behavioral Finance*. Oxford (UK): Oxford University Press, 2000

Taleb, Nassim Nicholas, *Fooled by Randomness: The Hidden Role of Chance in the Markets and in Life*, New York: Texere, 2001.

Taylor, John, "Discretion versus Policy Rules in Practice," *Carnegie-Rochester Conference Series on Public Policy* (39), December, vol. 39, pp. 195-214, 1993.

Figure 1

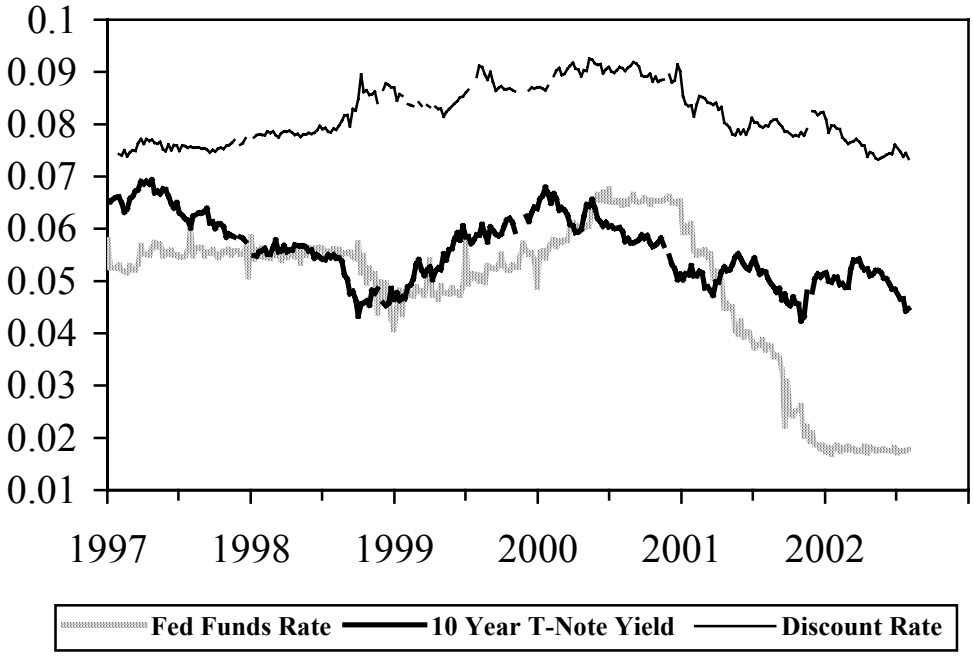
Stock Market Valuation as a Percentage of GNP



Note: Quarterly observations; first observation: 1925:4; last observation: 2001:4; median: 48.10; sources: CRSP (Center for Research in Security Prices): total U.S. stock market capitalization (provided on request); Haver Analytics (GNP from 1984:1 to 2001:4), and Balke, Nathan S., and Robert J. Gordon (1986) "Appendix B: Historical Data," in: Robert J. Gordon, ed., *The American Business Cycle: Continuity and Change*, Chicago: University of Chicago Press, 781-850 (GNP prior to 1984:1).

Figure 2

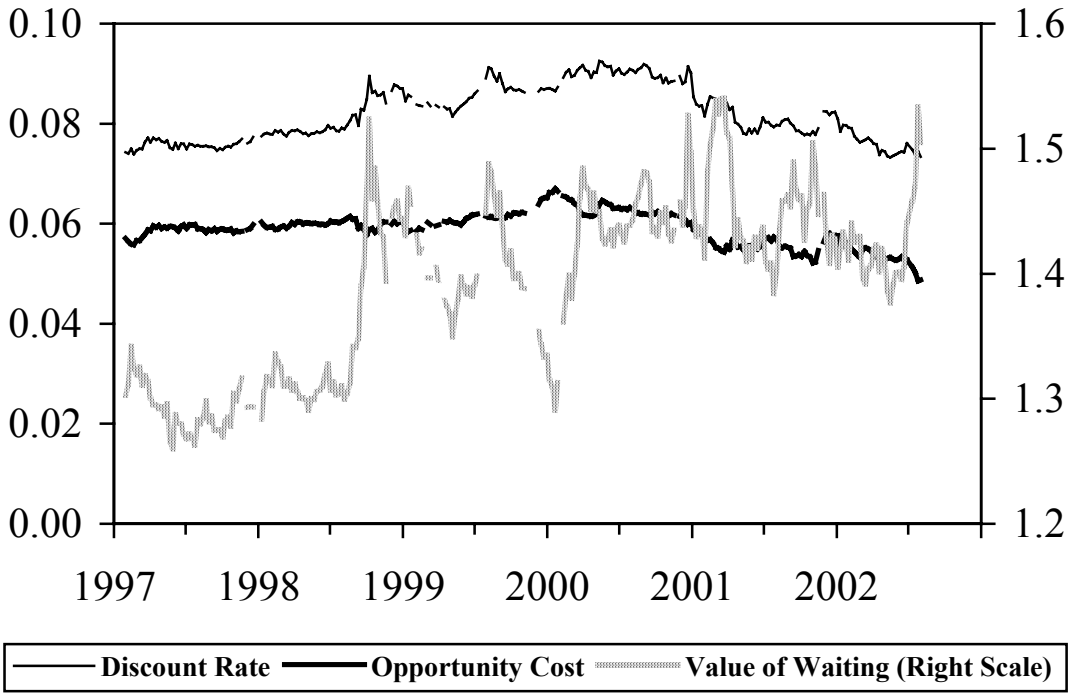
Berk Discount Rate



Note: Weekly observations (Thursday; Fed Funds: Weekly Median); last observation: August 1, 2002.

Figure 3

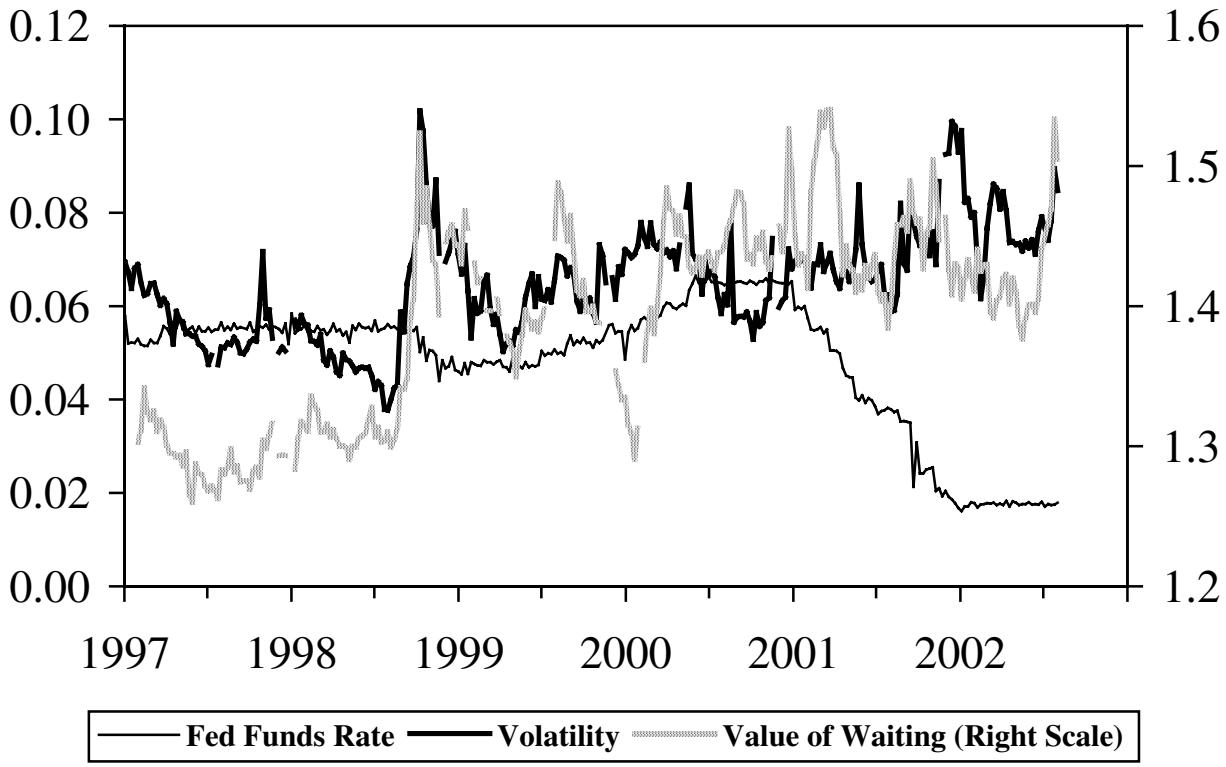
Berk Discount Rate and the Value of Waiting



Note: Weekly observations (Thursday); last observation: August 1, 2002.

Figure 4

The Value of Waiting, Cost of Carry, and Volatility



Note: Weekly observations (Thursday; Fed Funds: Weekly Median); last observation: August 1, 2002.